



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/917,346

07/27/2001

David G. Grier

40563/137

1222

27433

7590

03/08/2005

FOLEY & LARDNER

321 NORTH CLARK STREET

SUITE 2800

CHICAGO, IL 60610-4764

EXAMINER

FINEMAN, LEE A

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

411

Office Action Summary	Application No.	Applicant(s)	
	09/917,346	GRIER, DAVID G.	
	Examiner	Art Unit	
	Lee Fineman	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 15 November 2004.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-8 and 10-32 is/are pending in the application.

4a) Of the above claim(s) 10-22, 25-27 and 29-32 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-8, 23, 24 and 28 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 12/27/01 & 8/17/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____	6) <input type="checkbox"/> Other: _____

DETAILED ACTION

This Office Action is in response to an amendment filed 15 November 2004 in which claims 1, 23 and 28 were amended. Claims 1-8 and 10-32 are pending of which claims 10-22, 25-27 and 29-32 are withdrawn.

Claim Objections

1. Claims 1-8, 23-24 and 28 are objected to because of the following informalities:

Claims 1 and 28 include "a confocal microscope system" in both the preamble and the body of the claim (line 16, claim 1 and lines 13-14, claim 18). Since it is the same confocal system, the limitation in the body of the claim should read --the confocal microscope system--.

Claims 1, 23, and 28 include the limitation "each of the plurality of laser beams used to form an image of the sample forming a diffraction limited focal spot." The limitation is confusing; it is unclear how the laser beams can form an image. The reflected light of the laser beams from the sample will not be focused, much less diffraction limited, without an optical element, which is not included until later in the claim.

The dependent claims inherit the deficiencies of the claims from which they depend. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 2872

3. Claims 1-8, 23-24 and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 23, and 28 include the limitation “each of the plurality of laser beams used to form an image of the sample forming a diffraction limited focal spot, thereby establishing substantially aberration free resolution for all the diffraction-limited focal spots forming the sample image.” The specification and drawings teach a confocal microscope system with an optical element (214) that forms diffraction-limited focal spots at the sample, but does not disclose wherein the second optical element (222) also provides the detector (226) with an image of diffraction-limited focal spots, see specification page 8, second paragraph. Therefore each of the plurality of laser beams used to form an image of the sample forming a diffraction limited focal spot is considered new matter. The dependent claims inherit the deficiencies of the claims from which they depend.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5, 7, 23-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaez-Iravani, U.S. Patent No. 6,208,411 B1 in view of Grier et al., U.S. Patent No. 6,055,106.

Regarding claims 1-5, 7, 28, Vaez-Iravani discloses a confocal microscope system (fig 1.) for examination of a sample (106) comprising a source for a laser beam (101); a diffraction medium (102) which interacts with the laser beam to produce a plurality of laser beams (column 4, lines 42-52) which interact simultaneously with a plurality of sample volumes (fig. 1); a first optical component, having a focusing lens (105) with an input plane (back side of 105) with the input plane having an associated optical axis (fig. 1) and the input plane centered on the optical axis (fig. 1) to apply the plurality of laser beams to the sample (fig. 1), each of the plurality of laser beams used to form an image of the sample forming a focal spot (with 107 onto detector 108) and using a second optical component (107) for forming an image (onto detector 108) with the those focal spots (fig. 1) to establish a confocal microscope system for imaging the sample (fig. 1); and a means for detecting light/detector to sense light beams scattered from the sample (108); wherein the detector comprises a position-sensitive image-forming photodetector (column 5, lines 8-14), a charge coupled device (CCD), which is a pixellated area detector or a photodetector array. Vaez-Iravani discloses the claimed invention except for all the laser beams passing through a center region of the input plane wherein each axis of each of the plurality of laser beams coinciding with the optical axis in the input plane thereby bringing each of the diffracted laser beams to a diffraction-limited focus and further having a second optical element which forms diffraction limited focal spots thereby forming substantially aberration free resolution. Grier et al. teach a microscopy system (fig. 6) in which diffracted laser beams (fig. 6)

Art Unit: 2872

are passed through a center region (B) of an input plane (24) of a focusing lens (20) with the input plane having an associated optical axis (fig. 6) and the input plane centered on the optical axis (fig. 6) and each axis of each of the plurality of laser beams coinciding with the optical axis in the input plane (fig. 6, column 5, lines 1-7) thereby bringing each of the diffracted laser beams to a diffraction-limited focus (diffraction-limited focus is inherent in optical trapping). It would have been obvious to one of ordinary skill in the art at the time the invention was made to pass each of the laser beams in the system of Vaez-Iravani through each of the focusing lenses (105 and 107) in the way taught by Grier et al. to provide even smaller confocal spots and therefore better, sharper images thereby forming substantially aberration free resolution.

Regarding claims 23-24, Vaez-Iravani disclose in fig. 1 a method of performing confocal microscopy on a sample (106) to produce an image of the sample (onto detector 108) comprising the steps of providing a laser beam (101); applying the laser beam to a diffraction medium (102) having a preselected diffractive pattern (column 4, lines 41-52); outputting a plurality of diffracted laser beams from the diffraction medium, the diffracted laser beams having their spatial orientation defined by the preselected diffractive pattern (fig. 1); applying the plurality of diffracted laser beams to particular volume regions of the sample (106) corresponding to the selected diffraction pattern (column 4, lines 56-67); passing the diffracted laser beams through an input plane (back side of 105) of a focusing lens (105) with the input plane having an associated optical axis (fig. 1) and the input plane centered on the optical axis (fig. 1); each of the diffracted laser beams used to form an image of the sample forming a focal spot (with 107 onto detector 108) and using an optical component (107) for forming an image (onto detector 108) with the those focal spots (fig. 1) to establish a confocal microscope system for imaging the sample (fig.

1); and sensing light beams received from the particular volume regions of the sample (column 5, lines 1-14). Vaez-Iravani discloses the claimed invention except for all the laser beams passing through a center region of the input plane wherein each axis of each of the plurality of laser beams coinciding with the optical axis in the input plane thereby bringing each of the diffracted laser beams to a diffraction-limited focus and further having an optical element which forms diffraction limited focal spots thereby forming substantially aberration free resolution. Grier et al. teaches a microscopy system (fig. 6) in which diffracted laser beams (fig. 6) are passed through a center region (B) of an input plane (24) of a focusing lens (20) with the input plane having an associated optical axis (fig. 6) and the input plane centered on the optical axis (fig. 6) and each axis of each of the plurality of laser beams coinciding with the optical axis in the input plane (fig. 6, column 5, lines 1-7) thereby bringing each of the diffracted laser beams to a diffraction-limited focus (diffraction-limited focus is inherent in optical trapping). It would have been obvious to one of ordinary skill in the art at the time the invention was made to pass each of the laser beams in the system of Vaez-Iravani each of the focusing lenses (105 and 107) in the way taught by Grier et al. to provide even smaller confocal spots and therefore better, sharper images thereby forming substantially aberration free resolution.

6. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaez-Iravani in view of Grier et al. as applied to claim 4, and further in view of Horikawa, U.S. Patent No. 5,331,456.

Vaez-Iravani in view of Grier et al. as applied to claim 4 disclose the claimed invention except for the position-sensitive image-forming photodetector comprises a complementary

Art Unit: 2872

metal-oxide-semiconductor (CMOS) detector or microchannel plate. Horikawa teaches that a CCD, a CMD (a charge modulation device which is a CMOS), or a microchannel plate (column 1, lines 52-54) are art-recognized equivalents in the microscope art. It would have been obvious to one of ordinary skill in the art at the time the invention was made use any of the above detectors in the system of Vaez-Iravani in view of Grier et al. to detect the image.

Response to Arguments

7. Applicant's arguments with respect to claims 1-2 and 28 have been considered but are moot in view of the new ground(s) of rejection.

8. Applicant's arguments filed 15 November 2004 have been fully considered but they are not persuasive.

Regarding claims 23 and 24, applicant argues "Grier '106 clearly teaches away from using the system to form a confocal microscope system and instead instructs the reader to use a conventional light imaging system to image the sample" (page 14, lines 14-16) and "provides no bridge or reasonable basis for one of skill in the art to recognize the application of Grier '106 to modify the '411 system" (page 14, lines 20-22). The examiner respectfully disagrees. Although Grier '106 does not teach a confocal microscope system, Grier '106 is still an appropriate teaching because Grier '106 is only used for the teaching of a lens system using a diffraction limited focus, not the confocal system which is already disclosed in Vaez-Iravani. Further, optical elements/systems and their foci are commonly diffraction-limited and since Grier '106 provides a teaching of a specific way, i.e., in which diffracted laser beams (fig. 6) are passed through a

Art Unit: 2872

center region (B) of an input plane (24) of a focusing lens (20) with the input plane having an associated optical axis (fig. 6) and the input plane centered on the optical axis (fig. 6) and each axis of each of the plurality of laser beams coinciding with the optical axis in the input plane (fig. 6, column 5, lines 1-7) thereby bringing each of the diffracted laser beams to a diffraction-limited focus (diffraction-limited focus is inherent in optical trapping), it is the examiner's position that there is reasonable basis to recognize the teaching of Grier '106 in combination Vaez-Iravani to provide even smaller confocal spots and therefore better, sharper images.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2872

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lee Fineman whose telephone number is (571) 272-2313. The examiner can normally be reached on Monday - Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



LAF

March 2, 2005



MARK A. ROBINSON
PRIMARY EXAMINER